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MINING OPERATIONS

IN THE

PROVINCE OF QUEBEC

FOR THE YEAR

1901

Forming part of the annual report of the Department for the fiscal year 1900-1901

BY

J. OBALSKI M. E.,

INSPECTOR OF MINES.

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INSPECTOR OF MINES.

To the Honorable S. N. PARENT,

Minister of Lands, Mines and Fisheries,

Quebec.

Sir,

I have the honor to submit this special report on the mining industries of the Province during the year 1901.

From the administrative point of view, two important incidents occurred. In the first place, there was the amendment to the Mining Law which takes away from the surface proprietor the right of preemption on all lands patented since the 24th July, 1880 ; and, secondly, the creation of an assay office, at Montreal, in the laboratory of Mr. Milton L. Hersey.

The change in the law was applied without difficulty and was well received by all concerned. The assay office has given excellent results, and has enabled many prospectors, in return for the payment of a very slight fee, to ascertain the true value of their discoveries. At the Quebec office, about 250 specimens were examined.

There has been a great development in asbestos mining in the Eastern Townships and the works done and plants put in warrant the hope of a good output of chrome in Colraine and of gold in Beauce, during next year. Copper also seems to have assumed a little more importance,and there was reason to anticipate that the prospecting undertaken during the year would lead up to more extensive works; but the fall in the price of copper towards the end of the year will certainly impede the looked for development. Mica has passed through a difficult phase owing to the low prices offered by consumers. The other minerals of the Province were worked as in previous years. A new industry, from which much is expected, is in course of creation : it is that of compressed peat. A small establishment for the purpose was set up at Cacouna (county of Témiscouata), and yielded satisfactory results ; but unfortunately it was destroyed by fire, last fall.

As mentioned in my quarterly reports, the protection of women and children and the safety of workingmen has been sufficiently assured. Good order has reigned in the mining districts, and notably in the asbestos region, notwithstanding the large increase in the population during the year.

As far as our information goes, there were 7 men killed and 3 seriously injured during the year, in a population of 5,000 workingmen ; 6 hotel licenses were issued under the mining law and the sale of intoxicating liquors in the mining districts is well controlled and watched by our sergeant of police.

The total output for the Province represents about $3,000,000 or an increase of half a million over the previous year.

I have the honor to be, Sir,

Your obedient servant,

J. OBALSKI, M.E.,

Inspector of Mines.

Quebec, February, 1902.

IRON

There is nothing special to note as regards this industry. The blast furnaces at Radnor and Drummondville were in operation during a part of the year, and the following figures will give an idea of their results :

Ore extracted, 14,449 tons of 2,000 lbs.

Ore smelted, 15,376 tons.

Limestone used, 1,981 tons.

Charcoal used, 869,290 bushels.

Pig iron produced and shipped, 6,875 $\frac{1243}{2000}$ tons, worth $137,510.

Number of men employed, about 130.

At Drummondville, only one furnace was in blast for several months, using the bog ore coming chiefly from the counties of Nicolet and Drummond.

At Radnor, the furnace, which was in operation during fourteen months with an average daily output of some thirty tons, was shut down on the 1st November for repairs, which were to take two months to execute. The ore used is the bog ore derived from around Lake à la Tortue, and this year, in a great measure from Gentilly. The company is also trying iron ores from other parts of Canada and even from the United States. Since a couple of years, it has perfected the use of ochre as an ore and as agglomerating matter for the other ores. A mixture of ochre and magnetic iron sand, moulded and pressed into small cylindrical bricks of about a pound each by means of a special machine, is used; these bricks forming about 15 per cent of the composition of the charge.

Last year, a few loads of bog iron coming from the Lake Memphremagog copper mine were employed. This year, the company brought to Radnor ten car loads of titanic ore from the Kenogami mine where it did some work during the season.

The charcoal used at the Radnor forges comes from 45 kilns belonging to the company and located at the forges, at St. Thècle, Lake au Sable, Lake Peter and Paul and the Grandes Piles.

The Canada Iron Furnace Co.has temporarily given up the making of bricks, but continues to successfully work the celebrated Radnor springs,which produce a water now well known and appreciated in Canada and abroad. About 25 persons are employed in bottling and shipping this water. In the month of November last, nine car loads were sent out.

Apart from the ore used in the blast furnaces, there was little done in the Province and I append the results of my inquiries.

Leeds Mine

This mine, located on lot V. 7 of Leeds, comprises the properties of J. Nugent, S.E. ½, and McVeity, N. W. ½, forming in all 200 acres. It has been long known, and after a first examination, I mentioned it in the report of 1889-90, but there has hardly been any work done upon it since. Last fall, Mr. Chs Lionais undertook some prospecting work upon it to determine its value, and I had occasion to make an examination of it, the following being the result of my inspection.

The ore is magnetic iron occurring in well defined veins following the stratification of the chloritic schists designated as pre-cambrian by the Geological Survey. The general trend is N.N.E. magnetic and occasionally E.N.E., and the dip S. W. from 20 to 70 degrees from the horizontal. In the part prospected, I found four main veins from 3 to 12 feet thick, with important indications towards the east, the whole covering a section of about 1000 feet. Good outcrops occur at the two extremities of the lot and may be followed by the prospecting work done from point to point for nearly a mile. The dip needle shows these works to be well connected and also gives the certainty of a permanent deposit as above mentioned. As regards the depth of this deposit, there have been no works yet undertaken to determine it,but the presumptions are very strong that it continues in depth and it is even possible that, at some points, it assumes more compactness through the junction of several veins.

Practically, there has been no work done on this mine, only a small excavation of some 12 feet in depth and some stripping to lay bare the veins on the surface. Many loose pieces are also visible, some of them weighing twenty tons. These have become detached on the land which slopes towards the west.

One carload of the ore was shipped to Harvey Hill as a flux and another to the Radnor forges, which was taken from boulders on the surface.

The mine is two miles from the village of Kinnears' Mills, ten miles from Robertson Station, Q.C.R., and 20 miles from the Grand Trunk Railway Station, at Ste. Julie.

According to analyses by the Geological Survey, the ore in the pure state contains about 67 per cent of metallic iron, 0.2 per cent of phosphorus, 0.03 per cent of sulphur and no titanium. A recent analysis gives : iron 60.01, sulphur 0.3, phosphorus 0.225, silica 11.48.

This mine therefore contains large quantities of good grade magnetic iron ore, with few objectionable elements, which might be worked if there was a railway in proximity. It is however intended to have a line running through this region between the Q.C.R. and the G.T.R., which might be made to pass near this mine.

Other indications of similar ore have been found in the same direction on range X, but they have been little prospected.

There were no other discoveries during the year. The Scott mine at Iron Side, in Hull, was worked a little and some hundreds of tons were shipped. The Chester hematite mine was prospected a little by Mr. Pharo and gave, it seems, good indications.

I also visited a small mine of similar ore near Richmond, on the farm of Mr. Henry Hall, from which a small consignment was shipped to Drummondville.

Nothing was done with the magnetic sands of the North Shore, but there have been several important transactions with the government and with private parties ; one company, the Natashquan Iron Co, has also been formed to develop the deposits of that region. It is probable that the difficulties met with in utilizing these sands will be shortly overcome and that we shall see an important industry established on the North Shore.

Moisic River Deposits

During the summer, I visited the sands on both sides and near the mouth of this river.

From Seven Islands downward, the coast is sandy and, after passing Point au Basque, a little black sand is seen and commences to grow thicker at three

miles from Hall's brook; but the most important development is at July point; the quantity of sand then goes on diminishing until it disappears at about three miles from Moisic. It may therefore be said that the magnetic sand extends over nine miles, being particularly abundant on half of this distance and apparently workable on six miles, with July point as the centre.

There is also a little black sand in a small bay, on the right bank of the Moisic river itself, for a distance of about a quarter of a mile. July point occurs towards lots 4 and A; the ground is flat and there are no dunes higher than 10' to 12'; the beach is 500 to 300 feet wide on the average and in rear the land is clothed with small trees for a depth of about 1500 feet as far as a small lake and some marshy lands in which the iron sand has been found while digging near the lake. The veins of black sand are as usual several inches thick, and I find in my notes the following facts : Towards the 2nd mile from Moisic is a hill 12 feet high resting on a bed of coarse sand and showing a succession of small beds of black sand from 1 to 3 inches thick. I estimated that the mass might contain 18 per cent of black sand. Towards the 4th mile, there is a vein 8 inches thick and nearly pure. At July point, a cutting 4' thick was calculated to contain 60 to 70 per cent of black sand and appears to extend over 500 feet in rear. Along the line, 6 and 7 to 10 chains in the interior, black sand was found on digging beneath the moss. A little further on a cutting of 6 feet showed beds of 2 to 3 inches and seemed to contain an average of 25 per cent.

An estimate made a few years ago by a competent engineer placed the quantity of 70 per cent magnetic iron in sight along the front of lots 6, 7 and 8 for a depth of 1200 feet at over a million and a half of tons, the grade of the sands ranging from 6 to 50 per cent of magnetic on a thickness of several inches to 5 and 6 feet.

The question of the utilization of these deposits is the same as all the others on the North Shore. Shipments could be made on the eastern part of the Bay of Seven Islands, which is a dozen miles from July point.

On the eastern bank of the Moisic river, there is also an important deposit of black sand extending over a distance of about 1½ to 2 miles along the coast and from 4 to 5 arpents into the interior : the dunes are low, not exceeding 15 feet and ranging from 6' to 4' towards Forge brook with a thickness of 1 to 8 inches of mixed black sand. This deposit presents the same character as the one above. It is on this lot that were erected in 1866 the celebrated Moisic forges, which treated these ores in open furnaces. Their history was given in the report of 1889-90 and nothing remains of them,- except some debris of the furnaces and heaps of scoriae partly covered with vegetation.

In connection with the utilization of these sands, I had occasion to examine several concentrating machines :

1. The Waterhill Separator tested at McGill University. This machine is composed of two endless belts working perpendicularly the one to the other ; one conveys the sand,while the other,which is in connection with an electro-magnetic generator, removes from it in passing over the other the magnetic part which it drops a little further on into a reservoir when the magnetization ceases. This machine did not give satisfactory results on account of the irregular magnetization and distribution, but the principle might be applied with some changes in construction.

2. Separator of Mr. Jos. Labrèche, of Terrebonne, called the " Tornado Magnetic Separator. This machine is very simple and based on a good principle. It consisis of a vertical endless sheet turning over magnets during a certain part of its revolution ; the sand is fed at one end, the non-magnetic part dropping at once, while the magnetic is carried on until the magnetization ceases. The capacity of this machine can be altered according to its dimensions ; it can be worked by hand, is not very heavy and would be very useful in small sizes to prospect deposits. I assisted at a couple of tests of this machine and from the last we obtained specimens which were assayed by Mr. M. L. Hersey with the following results :

Magnetic sand obtained	.titanic acid	0
Tailings.	.magnetic part	1.86 %

These results are satisfactory and when the capacity of the machine will be in proportion to these favorable results, it will be destined to render good service.

3. I recall from memory the Crean machine which was tested at Montreal ; it is electro-magnetic and consists also of a horizontal endless roller and a ventilator. The results obtained were satisfactory both in quantity and quality.

Besides these apparatus, there is a certain number of patents, which are more or less practical, but the end to be sought and which has not yet been attained, is to purify the wet ore, which will obviate drying and expensive handling.

It may, therefore, be claimed that the problem of the purifying of the magnetic sands is solved, and no doubt, when the most practical machine comes into use. its operation will lead up to the necessary changes producing the typical one called for by this industry.

TITANIC IRON

There is nothing special to note as regards this ore ; the efforts to utilize it in some cases as iron ore and in others as ferro-titanite continue, as mentioned in a previous report (1899.)

An important article on this subject was published by Mr. A. Rossi, in "Mineral Industry," for 1901.

A new use for titanium is also noted in electric lighting. The carbon filament in incandescent lamps would be advantageously replaced by a filament of carbide of titanium.

Kenogami Mines

The deposit at Kenogami, county of Lake St. John, was opened up a little and some ten carloads were shipped to Radnor. I had occasion to inspect this deposit and I ascertained, that it extends for about ¾ of a mile to the north of and along the line of the Lake St. John Railway with a depth in the interior which I was unable to determine, but which, doubtless extends pretty far and is probably connected with the deposits in the township of Bourget, on the left bank of the river Saguenay. The quantity of this ore is consequently considerable and easy accessible. The bearing rock is anorthosite and forms low hills in which the ore appears to occur in big pockets. It is not of equal purity, nor does it contain an equal proportion of titanium all over. A specimen of average appearance, taken by me, showed 10.36 % of titanic acid.

Seven Islands Mine

Last summer, I visited this mine, which is situated at about 2 miles from the Bay of Seven Islands and on both sides of the Rapid river. It is composed of masses of magnetic iron holding heavy proportions of titanium and outcropping on the banks themselves of the Rapid river, where I followed them for a distance of about 500 yards in solid thicknesses of 15 to 20 feet. I found similar indications at some distance from the river, where the ore occurs on hills of about a hundred feet high, among others to the north west, where one of these hills forms a solid mass, being a continuation of the one visible on the right bank. The bearing rock is anorthosite.

This ore was worked a little about 35 years ago by the Moisic Company and I am told that some of it was used in those forges. There are still some piles on the ground which were then prepared and the traces of an old road. The Bay of Seven Islands, which is a fine harbor, is about 300 miles from Quebec.

Mention is made of this deposit in the Geological Survey's report of 1866-69, which assigns to it a length of 500 yards from east to west. The quantity is certainly large and represents millions of tons. We have on hand a certain number of analyses, which show that the proportion of metallic iron ranges from 45 to 50% with about 30 p.c. titanic acid and a very small proportion of sulphur and phosphorus. The proportion of metallic titanium is 39.71% in the titanic acid.

An experiment in mechanical separation was tried with the Waterhill Magnetic Separator at McGill University on this ore crushed,but did not yield sufficient results as regards the separation of the titanium. Another made with the Crean Separator did not give better results.

Other deposits of titanic iron have been observed in the neighborhood of Chicoutimi and near the Grand Discharge of the Saguenay.

OCHRE.

Ochre was extracted and prepared, as in previous years, at St. Malo in the neighborhood of Three Rivers, by the two companies : the Canada Paint Co. and the Champlain Oxyde Co. The earth is burnt on the spot and shipped in that state.

The quantity produced and shipped during the year in Canada and the United-States was 1253 tons of calcined ochre worth $14,595. Work is carried on only during six months of the year, and 50 men are employed.

Natural ochre is also employed as an iron ore by the Canada Iron Furnace Co., at Radnor. It is mixed with ores in sand or dust and small bricks are then made out of it.

CHROME.

There was little work done in the chrome region this year ; the Colraine Chrome Mining Co. shut down work both in the mines and the mill in May,

and confined itself to shipping the ore remaining over from last season. The Colraine Mining Co. also did nothing. The new company, the Montreal Chrome Iron Co. Ltd., formed to develop the Leonard mine, and to concentrate the ore, transferred its shipping point from Chrome Siding to Colraine station. A road has been built for 7¼ miles from that station to the mine, utilizing a part of the old road. The buildings, including the mill which had been erected at Chrome Siding, have been transferred to lot II. 21 near the mine. At the time of my visit in December last, 5 to 6 men were finishing the framework of the mill and the machinery was expected during the winter. There was a boarding house for the men. The mine was worked for about two months with a dozen men and stopped towards the end of August, about 1300 tons having been taken out and 11 carloads shipped.

L. Beebe & Sons.—This company did little work in its mines on lots B. 6, 7, of Colraine, but it put up a concentrating mill on lot XIII, 9, which went into operation towards the end of November. This mill is composed of a Blake crusher, two pairs of crushing rollers and a stamp mill of 5 stamps. The crused ore is passed through a sieve of 18 meshes to the inch and is concentrated on a Wilfley table ; the capacity is about one car-load of 20 tons per week ; the ore is shipped to Boston in bags, and at the time of my visit, in the beginning of December, two car loads had been sent. The power is supplied by a boiler of 90 horse power. The mill was to run throughout the winter, and it is in contemplation to add to it 2 other Wilfley tables, a Frue Vanner to treat the tailings and a cylinder dryer. I saw this mill at work and it seemed to me to be well arranged and to give good results ; the tailings appeared to retain very little chrome, and the concentrated article seemed to be pretty pure. This establishment marks a progress in the concentration of chrome ores,which demands the use of a table on account of the large quantity of fine stuff produced during the crushing. The mill is one mile from the mine and three miles from Chrome Siding, the shipping point. It requires 4 men to work it but, with the transportation, 15 were employed at the time of my visit. The company proposes to develop the mines during the winter.

A. Carrier and J. Lemelin Mine.—Is situated near the Jos. Nadeau mine, on lot A. 17 of Colraine, which was purchased from the government ; it is 5 miles from Black Lake, with which it is connected by a road that is good in winter, but very bad in summer. When I visited it in October, the mine consisted of a small excavation, some 15 feet deep from which a dozen tons had been taken out, great masses of chrome being visible at the bottom and on the sides. Sixty yards to the north east, there is another pit 40 ' by 15 ', and 30 feet in depth, supplied with a derrick,with which some 50 tons were taken out and also shows good indications of chrome. In addition, some small outcrop-

pings of ores on the surface may lead to other discoveries. This mine, recently opened, was only worked a little with 5 to 8 men, and has been closed down for the winter. It presents sufficient indications to warrant other works. The ore is of good quality, often grading 50%.

J. Nadeau and Richard Topping Mine.—This mine, which was mentioned in my last year's report, has been since regularly worked. In October, 9 men were employed, taking out about 3 tons a day with a horse derrick. There where about 300 tons of picked ore supposed to grade 50%. Last season, 248 tons of 49 to 50% were shipped.

The mine consists of 3 large pits very close to each other, the deepest being 40 feet in depth and the others from 20 to 30. Some fine blocks of ore are visible, and the surface shows many indications traversed by a vein of granulite running N. W. The working is done with 2 horse derricks ; the mine is on lot A. 16 of Colraine, 5 miles from Black Lake, and the carting can only be done in winter, and costs about $1.00 per ton ; latterly, they have begun to ship from Thetford. The ground is not high, but is nevertheless suitable for the dumping of the debris. Work was to be continued throughout the winter, the output for the year representing about 400 tons of high grade.

Besides the foregoing works, some prospecting was done, which showed a little chrome on lot III, 25 and its neighbours.

On lot I, 22, formerly prospected, there are a couple of hundred tons of low grade.

The total output of chrome was not large, but the shipments represent in tons of 2000 lbs :

1st class (concentrated and rock)...	592 tons worth...	$9424
2nd class " " ...	682 " " ...	7320
	1274	$16744

About 100 men were employed for periods of from 3 to 7 months.

There are still at the mines about 350 tons of high grade and 3200 tons of 2nd class and rock to be treated in the mill.

The prices were the same, $18.00 for 50 % and $10.00 to $12.00 for second class on the cars ; the demand was good and it is to be hoped that in 1902 with 3 mills running, the shipments will be much larger.

COPPER.

The Eustis and Nichols mines were in regular operation, as was also the Ascot mine. Some work was also done in the King mine.

The total shipment amounted to 20,296 gross tons, or 22,732 tons of 2000 lbs., worth at the mines, $126,500 ; a portion being shipped and some treated at Capelton for sulphuric acid ; 250 men were employed during the whole year.

There is nothing special to note. The Albert and No. 4 mines of the Nichols company were worked. At the Eustis mine, works at the bottom have led to the discovery of very large fresh masses of pyrites, from 15 to 50 feet thick and more or less rich in copper. This company also undertook to concentrate old dumps by means of jiggers.

Ascot Mine.—This property is now worked under the name of Wilfried Johnson, of New-York. From November, 1900 to March, 1901 the mine was shut down ; working was resumed at the latter date and has been continued regularly ever since with 10 men. The mine is supplied with machinery and all the work is done with compressed air ; two drills are employed. The working consists in following the indications of the ores by means of an inclined shaft following the most mineralized part. This shaft is of varying dimensions and slopes, running from east to north east at angles of 20° to 70° from the horizontal. It goes down for 250 feet, representing a vertical depth of 170 feet. The ore is composed of chalcopyrite pretty irregularly disseminated in a quartzoze schist, but occasionally isolated in pretty large bodies. At the time of my visit in October last, a drift was being driven at the bottom, showing ore scattered over its whole width say 7 ft., with a solid part in sight 2ft. wide by 25 ft. long. After washing, the ore is sorted on the surface. During the year small consignments were shipped to Capelton and the United-States, the grade being about 16 per cent of copper. There still remains a certain quantity at the mine, besides several hundred tons of low grade, which may be concentrated later.

The mine is in a condition to be regularly worked on a small scale. There is very little water and the rock is pretty solid. The shipping point is Sherbrooke, 4 miles distant by good roads.

KING MINE

This mine, controlled by Messrs. A. O. Norton, of Boston, and C. E. Kennedy, is composed of the western part of lot 4, in the XI range of Ascot, known under the name of the Bean property, comprising the Silver Star

shaft, and the eastern part of the same lot, King property, comprising the Norton shaft.

The Silver Star shaft was begun two years ago, and is supplied with a small steam engine ; it goes down to a depth of 40 ft. This shaft is inclined and follows a vein of S. W. trend, dipping S. E. at an angle of 35° from the vertical. The vein shows a thickness of from 7 to 8 ft,of which from 2 to 3 ft are well mineralized. The ore is iron pyrite, containing a little chalcopyrite and various sulphurets. It also contains a variable proportion of gold and silver, some selected specimens having yielded as much as $27 of gold and another, 119 ounces of silver.

Some thirty tons were taken out and at the end of the year 1899, a fault having been encountered which caused the vein to be lost sight of, the works were suspended. They were resumed in October, 1901, in order to try to find the vein and to connect this shaft with the Norton shaft situated at a distance of 1300 ft. in the direction of the vein.

The Norton shaft is 100 ft. deep, sloping along a vein which seems to be the same as that of the Silver Star. This shaft communicates with the workings of the old Howard mine (lot 5) which was worked some years ago on a large scale, by an American company represented by Mr. F. J. Falding who took out an important quantity of ore, the vein then crossing to the King property, which was worked on payment of a royalty.

Since the month of October last, this shaft has been worked to lay bare the ore which exists in a well mineralized vein ; 150 to 200 ft. of drifts have been made to reach the ore of which there are several thousand tons in sight. About 100 tons of good quality have been extracted. According to analyses communicated to us, the average grade of the good ore is 2.5 to 3 per cent of copper, 5 to 7 ounces of silver and 31 to 33 per cent of sulphur.

This shaft is provided with steam pumps and machinery, and a dozen men are employed in the two shafts, and it is intended to run a drift along the vein in order to connect with the Silver Star shaft. A fault has also been met with at the bottom, which throws the vein to the east.

G. E. SMITH MINE

I visited this mine (Potton, IX, S.E.¼, 28), about twelve years ago, and with the slight prospecting then done, I had noted the large body of ore existing there. Last fall, I made a new examination of which I give a summary of the result. The ore is a pyrite of iron partly magnetic (monosulphide) and containing a certain proportion of chalcopyrite scattered through

the mass. The composition of the pyrite is pretty complex and contains lead, zinc and antimony, with traces of nickel and arsenic. The useful substances consist of copper in the proportion of less than 1 to 7 per cent, of 35 to 45 per cent of sulphur and a small portion of silver. The lead, zinc and antimony occasionally attain several units of percentage, while the nickel and arsenic remain in the state of traces.

When I visited this mine in November last, the workings consisted of an excavation, 60 ft. long by 40 ft. deep, showing a solid mass of ore 50 ft. wide, between two well defined walls, the roof being formed by the chloritic schists (pre-cambrian) of the region, and the wall which has not yet been reached, but which is not far off, by the diorite forming the Hog's Back and other hills.

This excavation is drained by a tunnel of 200 ft. in the direction of the roof. At the bottom of this opening, a shaft 40 ft. 6 x 8 has been sunk. It was full of water at the time of my visit, but I was assured that it passed entirely through solid ore. The veins runs N. 30° E., with a dip of 40° west, at the point where the stratification of the schists appears to be E.N.E.

At 200 ft. to the N.N.E., another small excavation has been made on the vein without reaching the walls,the conditions being the same as in the former. It may therefore be said that between these two points to the level of the bottom of the shaft, there are upwards of one hundred thousand tons of ore in sight.

Several other openings have been made on the vein in the same direction, showing it to be of the same character. I found them on about 500 feet. I was assured hat the indications continue on a length of 1000 feet, descending the hill, the lowest being 300 feet lower than the main works. When I visited the place, as these prospects were several years old, they were covered with bushes. It will thus be seen that this property contains a considerable quantity of ore. This mine could easily be worked by a tunnel beginning at the lowest point, following the vein and joining a shaft sunk at the highest point, which would secure easy drainage and ventilation. The rock on both sides is solid enough and would necessitate but little timbering. I saw no indications of faults or breaks on the surface.

The vein is discernible on the surface by a capping of limonite arising from the decomposition of the superficial parts and its thickness may vary from 1 to 6 feet in the uncovered portions. This limonite constitutes a real iron ore, containing at least 50 per cent of metallic iron with a little sulphur, but no phosphorus. About 125 tons of it were shipped to the Radnor forges

in 1900. Between this limonite and the solid ore is a layer of decomposed matter rich in oxydized products of copper and caused by the washing of the copper limonite.

About 2000 tons of ore that have been got out are at the mine and a few loads only have been shipped to places in Canada and the United States to be tested. Some portions of these ores burn easily on exposure to the air owing to the sulphur they contain. The waters of the mine possess strongly developed petrifying properties and remarkable specimens can be seen of wood, moss and other products completely transformed into iron ore through the acidity of the water holding a saturated solution of iron salts.

The property contains a little timber and covers 50 acres ; it is one mile from Lake Memphremagog, 700 feet above its level (Knowlton Landing) ; 14 miles from Magog Station ; 8 miles from Eastman,on the Canadian Pacific Railway in winter ; 3½ miles from Bolton Centre, the terminus of the Orford Mountain Railway Company, which does not work this portion of the line from Eastman. An extension might be built to the mine.

The mine is the property of the "Memphremagog Mining Company," represented by G. E. Smith, of Sherbrooke, who controls 150 acres of land in all.

During the year, owing to the high price of copper, there was some question of re-opening several mines, amongst others the Ely and the St. Francis mines. After the old works had been pumped out, I had an opportunity of inspecting these mines that had been abandoned for many years, and I give some notes in conection with them.

St. Francis Mine.—Is on XII, S.E. ½, 25 of Cleveland, 3½ miles from Richmond (G.T.R.) It was worked about 1860 and provided with plant and machinery, part of which is still at the mine. It was worked for many years by means of a sloping shaft on the vein 198 feet long with 3 levels at 42', 102' and 174', where drifts were begun in both directions with incipient rises to connect the drifts. At the lower level, the greatest development is attained on the N.E. by a drift 252 feet long. A description of this property is given in the report of the Geological Survey for 1866 (page 38.) The mine consists of a vein of quartz and feldspar running N. E. and intersecting the stratification of chloritic schists of the region and near the diorite contact on the N.W. It dips 70° from the horizontal on the N.W. This vein seems well defined and contains, disseminated or in pockets, ores such as bornite and chalcopyrite

with a certain abundance of carbonate of copper. I visited this property in October last, and had an opportunity of inspecting the first level which is reached by a tunnel of about forty feet. The drift, 36 ' to the N.E., and about 15 ' to the S.W. shows a well defined vein with some cavities ; the thickness varies from 3 ' to 5 '; a little ore in pockets is observed and one can see that in this part at least, some stoping has been done and no doubt the best part of the ore removed. On the S.W., a few inches of carbonate are exposed. On the surface is a dump showing numerous grains of rich ore which may contain 2% of copper. The outcropping of the vein can be followed for some hundred yards with slight indications of copper in sight. According to Mr. Francis Bennett who was the last to work this mine, the average of the vein was 8% of copper, and while mining was carried on, a certain quantity, amounting to about 2 tons a day, was shipped.

In 1865, the mine belonged to the St. Francis Mining Company ; it was sold to the Canadian Copper Pyrite and Chemical Company, but not much work was done ; in 1874, it became the property of the Canadian Copper and Sulphur Company, and was worked until about 1880.

Ely, VII, 3 S. ½ 4.—This mine which I visited in October last, consists of a strip of magnesian limestone running in a N. E. direction with a dip of 70° N.W. from the horizontal. It agrees moreover with the stratification of the talcous schists of that region. This limestone may be followed for a distance of 300 to 400 feet, and a thickness of 60 ' has been found, one-half showing indications of copper. The ground slopes to the S.E. and many detached pieces may be seen, some consisting of several cubic yards of rock similar to that of the vein. To the N. W., there are indications suggesting the existence of a similar strip.

The vein has been prospected on the surface by several cuttings and openings showing an abundance of green carbonate which seems to be a decomposition of the vein ore. An inclined shaft 8 by 12, and 55 feet deep has been sunk on the wall of the vein. I went down and found a series of small veins of bornite and chalcocite parallel to the direction and which constitute the mineralization of this strip ; their thickness varies from 2 to 3 inches besides the ore disseminated in the rock and it may be said that in the exposed face, say a thickness of 8 feet, the mineralized portion is represented by one-tenth.

A specimen taken by me at the bottom of the shaft yielded 44.25 per cent of copper with about 45 per cent of gangue. Another good average specimen, representing probably one-sixth of the vein, yielded 10.30 per cent. The shaft was sunk 35 years ago, but was recently pumped out. There is only

a small building at the mine, and at the surface are some tons of ore formerly taken out, consisting of bornite and chalcocite and containing about 13 per cent of copper. This mine is a mile and a half from the Orford Mountain Railway which joins the C. P. R. at Eastman, a distance of 16 miles.

Other mines.—Some work was also done at the old Bowers mine, in Melbourne, I. S., but I had no opportunity of visiting it.

Practically nothing has been done at Harvey Hill, but the old Nutbrown shaft on lot Leeds XIV, 14, has been pumped out to ascertain whether the Harvey Hill veins continue in that direction.

In the county of Matane, in St. Denis, some prospecting has been done to develop the indications of native copper found in the diorite of that region. Thus a piece of copper weighing several pounds has been found together with important indications of chalcopyrite ; the work is to be continued and a shaft will be sunk this winter.

LEAD.

The only mine of galena worked this year in the province, is that of Lake Temiscamingue by the " British and Canadian Lead Co., Ltd.," of London, formerly the " Anglo-Canadian Lead Syndicate, Ltd."

I visited this property in the month of August. It consists of a vertical shaft 250 feet deep with a working level at the bottom and another at 200 feet. The shaft is provided with a cage with safety appliances. At the 200 feet level is a drift or rather a great stoping 100 feet long in the direction of the lake whose waters when at their highest come within 75 feet of the month of the shaft. At the 250 feet level the development extends for a distance of from 30 to 40 feet only. The ore is found in a mass of calcite the mode of formation whereof I have hitherto been unable to determine but which looks like a sort of chimney. The galena is disseminated in proportions varying from 20 to 25 per cent in the rich parts and is about 5 per cent in the poorer parts. It is estimated that the mine yields one ton of concentrated for every 9 tons of ore taken out ; the concentrated ore contains from 70 to 77 per cent of lead, and from 15 to 17 ounces of silver to the ton. The galena seems more abundant at the lower level.

The rock is solid enough and requires little timbering ; there is very little water ; the mine is lighted by electricity.

The outer installations at present in use consist of hoisting machines, air-compressors and concentrating plant made up of rock-breakers, rollers, jig-

gers and Wilfrey tables ; 6 additional jiggers and 4 Wilfrey tables have recently been put in besides a tank holding 20,000 gallons of water in case of fire and a wharf has been built on the lake. Practically there are two mills, each having a capacity of 6 tons of concentrated.

In the vicinity of the mine are buildings and boarding houses for the staff and the workmen. It is situated about 8 miles from the village of Ville Marie, with which it is connected by a good road. The ore is shipped *via* the lake to the railway at the head of the Long Sault, and freight costs about $3.50 per ton. The yield for the year was about 533 tons of concentrated ore, 227 of which were shipped. The mine was in operation throughout the year and some forty men were employed there.

GOLD.

But little work was done this year and, with the exception of some slight individual prospecting of small importance, only by " The Gilbert River Gold Fields Company," on the Gilbert (Beauce), and by " The Dominion Mining Company," on Big Hollow Brook, in Westbury (Wolfe).

The Gilbert River Gold Fields Co, Ltd.—I give below the various phases through which this organization has passed to reach the present situation. The Beauce Syndicate began its operations in October, 1899, by taking possession of the shaft and works on lot 14 de Léry of the Beauce Gilbert Gold Mining Company, whose contract had just expired. After 6 months labor in the old works they had to be abandoned on the 9thMay,1900, owing to the quantities of water that filtered through the thick bed of gravel covering that zone and through the old works along the Gilbert river for a distance of about 400 feet and which were inundated at high water. About 80 ounces of gold had been taken out. The company then undertook two other shafts on lot 13 ; the first was stopped after digging 15 feet in quick sand and finding by boring that it formed a bed about 25 feet thick which was too difficult and too dangerous to cut through.

This shaft was situated between the last shaft sunk by Mr. Lockwood and the Gilbert Co. Subsequent borings struck clay at a depth of 8 feet about 150 feet from that point and another shaft was begun on the 15th May. After digging through 8 feet of quick sand and 35 feet of pipe-clay,gravel was met with and also water at the same time. The work was again stopped in order to put up machinery and also in consequence of a threat of a law suit made by Mr. Lockwood who claimed to have rights to this lot. No other work was done until the end of 1900 and the Beauce Syndicate transferred all its rights to the present company,The Gilbert River Gold Fields Co,Ltd, which also obtained from

The McArthur Bros. Co. the concession of sections 3 and 4 of the seigniory of Rigaud-Vaudreuil. In October, 1900, a shaft was begun on lot 14 about 300 ft. to the south east of the shaft known as Smart's shaft. At a depth of 32 feet, quick sand was met with ; attempts were made to get through it by means of a tight box sunk by means of a powerful jack-screw. At a depth of 42 feet, this had to be given up as the pressure of the sand forced in the box. To avoid removing the machinery, another shaft was begun about 20 feet away. Another and stronger box 10 feet wide was made of spruce planks 5½ inches thick, and after much difficulty 31 feet of gravel were encountered, followed by 27 feet of quick sand and then blue clay was struck. The pressure was so great that the very planks were bent and the shaft could not be sunk vertically. After cutting through 3 feet of clay, another bed of quick sand was met and in half an hour there were 15 feet of sand in the shaft which had likewise to be abandoned at the beginning of 1901. As it was practically impossible to get through this bed of quick sand, it was decided to make use of the old Smart shaft sunk over 20 years ago. On the 8th January, 1901, the snow covering it was removed, a donkey engine was put up, 40 feet of the shaft were timbered afresh and the water pumped out to the bottom, say a depth of 95 feet. Bed rock was then struck and the timbering being in perfect preservation, about 200 feet of old drifts were cleared out, old paying ground that had formerly been worked was found and it was ascertained that the only part not worked was to the south of the shaft. This part was reached after a detour of about 200 feet to avoid the old works and it was found that a vein of paying gravel had at last been struck. These works lasted 7 months. Then mining was begun ; on the surface, an inclined tramway 500 feet long was constructed to convey the gravel to the sluices fed by a ditch taking water from the branch of the Gilbert.

On the 1st July of that year, the company again worked at the shaft on lot 13 which had been abandoned for the reasons given above ; bed rock was struck at 47 feet but on the rim. About 120 feet of drift were excavated in a south easterly and northerly direction and gold was found at various points but unevenly distributed.

At the end of the season, the gravel obtained from Smart's shaft and from that on lot 13 was washed and yielded 75 ounces of gold.

Owing to the difficulty of working in the south part of Smart's shaft, it was decided to sink a new one in order to reach this paying part.

I visited the works at the beginning of December ; the sinking of the shaft was begun ; and the machinery was being put up. It was

thought that 14 feet of quick sand would have to be got through and a solid box was made 20 feet high, 7 ' 8 " x 3 ' 8 ", strengthened by strong cross ties. It was hoped that bed rock would be struck at a depth of 70 feet. The machinery installed has a capacity of 50 tons a day ; the shaft will be provided with a cage and underground conveyance will be effected by means of small tramways. It is therefore to be hoped that the company's perseverance will be rewarded and that in 1902 we shall see a steady yield of gold in this section.

The above facts were furnished me by Mr. Frederick Hildreth, the superintendent of the works. The company worked throughout the year with an average force of 30 men, all included.

The Dominion Mining Co., of Boston, worked during the summer on Big Hollow Brook, in Westbury. It is intended to follow the bed rock starting from the lower part of the river to the highest level. The water will be kept back above by a dam and by means of pipes already on the spot, the superficial portion will be washed by the hydraulic process so as to be able to work in the open on the paying gravel found at the bottom by shafts sunk by the first prospectors, L. Mathieu and others. It is probable that these projects may be partly carried out during the summer of 1902.

ASBESTOS.

The asbestos industry that was already in a flourishing condition, last year, has again developed considerably this year and the yield has reached a figure which, if maintained, will make this industry one of the most profitable in the Province. I will briefly go over the history of asbestos. The asbestos industry was first spoken of in 1878. The Quebec Central has just been built and near the line, at Thetford, Mr. A. Johnston and others, and Messrs. King Bros. made some slight excavations and got out a small quantity of long and fine asbestos, the short fibres being rejected. It is stated that 50 tons were taken out in 1878, all the work being done by hand. The sale and market for this product seemed uncertain ; nevertheless, all the lots of this district that could show any asbestos were then bought from the Government and strange to say hardly any merchantable asbestos has since been discovered outside of these lots. The asbestos which moreover had hitherto been used in small quantities came almost exclusively from Italy, being the fibrous tremolite variety, while the Canadian asbestos is fibrous serpentine.

A steady market was found, the yield increased and the statistics of the Geological Survey give the following figures :

In 1879.	300	tons	worth.	$ 19,500
" 1880.	380	"	"	24,700
" 1881.	540	"	"	35,100
" 1882.	810	"	"	52,650
" 1883.	955	"	"	68,750
" 1884. 1141		"	"	75,097
" 1885. 2440		"	"	142,441
" 1886. 3458		"	"	206,251
" 1887. 4619		"	"	226,976

Steam machinery was then used and the development of the industry continued to increase steadily .Thetford and Black Lake, which were merely " flag stations " with a few houses and log camps, are now flourishing villages with a population of 6,000 souls, 1500 persons being employed in the mills and factories. The value of the machinery and installations represents from two to three million dollars ; the yield in 1900 was about 29,000 tons of asbestos and its products, including those of Danville, worth over $700,000 at the mine and at the mill. For 1901, the yield is 40,387 tons of asbestos worth $1,284,429.

I give below the shipments of asbestos from Canada for the periods ending on the 30th June of each year, according to the Ottawa Tables of Trade and Navigation :

1887-88. . . .	3428¼	tons,	estimated at. . . .	$ 228,535
1888-89. . . .	4648½	"	"	323,886
1889-90. . . .	6563	"	"	444,159
1890-91. . . .	7022	"	"	513,909
1891-92. . . .	7316	"	"	514,412
1882-93. . . .	5898	"	"	396,718
1893-94. . . .	6229	"	"	339,756
1894-95. . . .	8593	"	"	493,075
1895-96. . . .	9588	"	"	482,679
1896-97. . . .10969		"	"	516,916
1897-98. . . .18424		"	"	510,368
1898-99. . . .14520		"	"	453,176
1899-00. . . .18164		"	"	490,909
1900-01. . . .26715		"	"	864,573

Previous to 1887, the shipments of asbestos were not given under a separate heading.

As the Province of Quebec is the only one that produces asbestos, these figures may be considered very accurate, the quantity manufactured in Canada being of no importance. Practically, the entire output is shipped including all the products of asbestos and also asbestic.

Output according to the companies' reports :

1897. . . .	.25365	tons, valued at.	.$ 380,000
1898. . . .	.23015	" "	511,256
1899. . . .	.23266	" "	598,736
1900. . . .	.29433	" "	735,364
1901. . . .	.40397	" "	.1,284,429

From 1882, the output increased steadily ; the mines of Thetford, Black Lake and Danville were developed while some tests were made in the direction of Colraine and a few in the Ottawa Laurentian region. Steam machinery was put up and attempts made to simplify the work. The demand and prices increased, reaching their maximum about 1890 when first class crude asbestos sold for $250 a ton. These prices were probably too high, for difficulties arose between producers and buyers, resulting in the shutting down of the Black Lake mines and a considerable depression in the market, the price of first class asbestos dropping to $80.00. The companies then improved their plant, used compressed air, replaced boom derricks by cable derricks, and developed their sorting processes. About 1894 mechanical processes were resorted to every where for utilizing short fibres. A steady demand began for the product called " fibre," and the companies provided themselves with plant for the purpose. Gradually, the demand increased and from 1896 the old debris containing short fibres were again treated in the mill while at Danville a large mill was erected for the manufacture of asbestic. Prices grew steadier and reached $200 for first class. The demand increased and the result is the flourishing condition of affairs that we witness to-day,when all the rock containing fibre goes through the mill, necessitating the erection of mills of great capacity, a description of which we will see further on.

At the end of this report will be found the list of companies in operation to the number of 10, which produce crude asbestos and fibre and possess important mechanical appliances.

The asbestos mills or factories for separating the fibres are all based on the same principle and the few following details may apply to all the companies.

Mining is carried on in quarries which, at Thetford, are 170 feet below the top of the hill which is itself 80 feet higher than the railway line. At

Black Lake, the top of the hill of serpentine is 900 feet higher than the lake, and 750 feet higher than the line. Compressed air is used for drilling and cable derricks for hoisting out.

The rock containing asbestos is roughly sorted at the mine, and goes to the cobbing shed, to the mill and to the dump.

That intended for cobbing goes to the sheds where young boys with a light hammer separate the fibre from the rock, thereby forming the 1st and 2nd qualities of "crude," the waste whereof goes to the mill. In the mill are treated the rock containing a little fibre, the waste from the cobbing of the 1st and 2nd qualities of crude asbestos and the waste from the mine.

The latter contains a great deal of fibres and there is so much of it that the companies have deemed it necessary to put up driers over which it passes before being crushed. Some companies run all their rock through the driers especially in wet seasons. These driers are cylinders from 30 to 40 feet long with a diameter of 3 to 5 feet and are heated outwardly by the flames of a fire. In some cases, they are heated inwardly by a current of hot air. They have a slope of about 1/12 and the axis is provided with blades for stirring and dividing the mass. The rock thrown in at the higher part arrives quite dry at the lower end and is put into the crusher directly or by means of an elevator.

The first crusher is of large dimensions and the rock comes out as big as one's fist ; it then goes to a smaller one which breaks it into pieces the size of a nut. In some mills the rock then passes on to an endless table from which children pick out the fibreless pieces. The mass is then taken to the rollers which are plain or corrugated but in some mills it is first screened and classified into fine and coarse. The mass generally passes through two pairs of rollers and is thereby reduced to a coarse sand. Conveyance from one apparatus to the other is effected by elevator. Some companies at once run this sand through shaking screens with a draught at one end and the lightest fibrous parts are carried off by means of a ventilator. In every case the sand is conveyed to the cyclones consisting of a metal box in which two wheels with blades revolve very rapidly in opposite directions completely pulverising the product which is sucked up and taken to shaking tables provided with exhaust fans ; these separate the fibre from the fine sand, the latter forming what is called asbestic. In some cases these cyclones have been replaced by Jumbo machines, used chiefly by the Johnson company. The products sucked up are conveyed to depositing rooms whence they are taken to the room where they are put in bags. At the beginning of this industry, the companies turned out a certain number of various qualities which are at present practically

reduced to two : fibre properly so called and paper stock made of very short fibres. Some companies prepare special products that are asked for and others subdivide these qualities.

In connection with cobbing the Union Mine usess a kind of Chilian mill with upright stone wheels revolving in a metal trouh. The crushers generally used are those of the Blake system ; the Bell Asbestos Co., however, also uses the Gates & Dodge crushers.

The capacity of the mills may be calculated either by the quantity of rock passing though them or the quantity of merchantable products obtained. The proportion of fibre in the rock varies but, as regards the Thetford mines, for instance, it may be taken as follows : 1 to 2 per cent of crude (1st and 2nd), and 6 to 7 per cent of fibre and paper stock. Nevertheless the waste from the mine and the cobbing must yield 10 per cent, and sometimes much more. It may therefore be said that a well managed mill, treating say 500 tons of rock, should turn out from 30 to 40 tons of merchantable products a day.

The average prices paid for asbestos are as follows :

1st crude.	$180 to 200
2nd crude.	100 to 125
Fibre.	30 to 60
Paper stock.	15 to 25
Asbestic.	1 to 3

Crude asbestos and the mill products are sold in 100 lb. bags.

The machinery used in the asbestos districts generally comes from Canadian manufacturers ; Jenckes Co., Rand Drill Company of Sherbrooke ; Laurie, of Montreal and others.

The coal comes from Nova Scotia, and latterly fine (buck wheat) coal from Pennsylvania has also been used. A company is organized to make use of the falls of the St. Francis river near D'Israeli with the intention of supplying the necessary power to the Black Lake and Thetford mines, situate at a distance of from 10 to 15 miles. This innovation would certainly promote the development of mining industry in that region.

During the course of the year, very important works have been carried on. At Danville, the mill destroyed by fire last year is being rebuilt. At Thetford, the King Bros. Company, the Beaver Asbestos Company and the Johnson Co. have erected new mills of considerable capacity. The Bell Company

has enlarged the one already in operation. At Black Lake, the Johnson Company has also erected a mill and so have the Manhattan (formerly the United Asbestos Co.), and the Standard Asbestos Company (formerly the Anglo-Canadian Asbestos Co.). Improvements have also been made to the mill plant of the Canadian Asbestos Company and Union Mine. Dr. Reed has also put up a small mill.

King Bros.—During the year, this company has done important work consisting in opening new excavations in the vicinity of the old ones. The dumps have also been removed to prepare for new openings ; to that end 3 new cable derricks with their machinery have been put up ; a locomotive and trucks of a capacity of several tons are used for conveying rock to the mill and debris to the dumps.

At present there are in all 7 cable derricks on the property. The old mill continues working but a new one of considerable capacity has been built on the other side of the line of the Quebec Central Railway which was commenced at the beginning of last year, and has been running since July ; it is capable of treating from 500 to 600 tons of rock and turning out from 30 to 40 tons of merchantable products. This mill is driven by a compound condensing engine of 850 horse power ; the power is supplied by a set of 5 boilers of 175 horse power each, and the water for condensing and feeding the boilers is brought from the Thetford river by a special pump.

The plant of the mill consists of 3 crushers, 2 pairs of crushing rollers 6 cyclones with the usual fixtures, elevators, shaking screens, ventilating fans, depositing rooms, etc., the whole lighted by electricity supplied by a dynamo of a capacity of 500 lamps.

The whole is contained in a 3 story building which also contains a new air compressor capable of working 14 drills. An annex has also been built for a cylindrical drier.

Bell Asbestos Co.—This company has increased the capacity of its mill by several important additions. It now contains 4 crushers, viz : 2 Blake, 1 Gates and 1 Dodge, and 4 cyclones.

At the mine, a shaft of 87 feet deep has been sunk in the N. E. part with a couple of hundred feet of drift encountering serpentine rich in asbestos which is now mined in these underground workings lighted by electricity and offering great advantages for winter work.

Beaver Asbestos Co., Ltd.—This company which had abandoned its mines a few years ago, has built a mill on its property which began working in August. This mine is a large building 3 stories high, containing one engine fed by 5 boilers. There are 2 crushers, 2 pairs of rollers, 3 cyclones with the usual fixtures, the whole lighted by electricity. The mill has a capacity of 250 tons of rock. The mine is supplied with compressed air machinery, 4 cable derricks and 1 boom derrick.

Johnson Asbestos Co.—A new mill has been put up at Thetford by this company. Its capacity is greater than that of the old one. The difference between this company and the others is that it does not use cyclones but a special machine for extracting the fibre which it calls Jumbo, and consists of 2 sets of iron arms revolving around 2 axes in opposite directions, the whole contained in a large box laid horizontally from which the fibres are drawn out by suction. The company now uses a steam locomotive for the service of its Thetford mines.

The Johnson company has also built a large mill at Black Lake, which began working only in December last. It consists of a set of 2 steam boilers and an engine (Tandem Compound Corliss) of 300 horse power, driving 3 crushers, 2 sizing trommels perforated with ½ inch and 2 inch holes, 3 pairs of plain and corrugated rollers, 1 single and double machine for extracting fibre (Jumbo), 6 shaking screens with ventilating fans, elevetors, horizontal conveyers, etc., the whole contained in a large 3 story building lighted by electricity.

The capacity of the mill is 300 tons of rock a day, and it connects with the mill by a tramway which brings the rock to the upper part of the mill, the fine product being received below.

Standard Asbestos Co., Ltd.—This company, formerly the Anglo-Canadian Asbestos Co., under the management of Mr. R. T. Hopper, did not work this year, but made preparations to commence shortly. To that end a 3 story mill been has erected consisting of a building 80 x 40 feet, an annex 40 x 50 feet for the engine, and another 40 x 40 feet for the boilers.

Two boilers of 120 horse power and an engine of 200 horse power have been installed for the mill, which contains the usual machines : crushers, rollers, tables, 1 cyclone with room for 2 others, the whole lighted by electricity supplied by a dynamo of 150 lamp power.

The company has its old mining plant and with the good land it owns it should greatly contribute to the output of 1902.

Canadian Asbestos Co.—The work was continued by clearing out the old shaft and making fresh openings in the surface in the direction of the mountain and towards the N. E. Serpentine rich in asbestos has thus been brought to light which promises a bright future with easy mining. Improvements have also been made to the mill.

Manhattan Asbestos Co., formerly the United Asbestos Co., re-opened this year, and steadily worked by making use of the waste and cleaning out the old works. Moreover a mill was built which began working at the end of July. This mill, built on the usual principle, contains the ordinary plant : crushers grinders, tables and 2 cyclones, 3 boilers of 300 horse-power supplying the necessary power for the machines, electric light, etc. The mine is provided with compressed air plant, 3 cable derricks and a tramway to carry off the waste behind the mountain.

W. R. Kerr & Hayden.—They prospected during a part of the year on lot A. 31 of Colraine, and about the month of December, obtained the control of lot B. 32, the property of A. Murphy, formerly worked by the Montreal Asbestos Company. This property lies at the foot of Black Lake hill, and the work formerly done shows abundant indications of fine long fibre which gave a certain production. The recent prospects made by the company have confirmed these facts and I understand that it is intended to develop this property by installing machinery which will probably produce a considerable output in 1902.

J. Reed.—Some work was done on this property this year. On lot 29, a steam derrick was put up and some work done which produced a certain quantity of asbestos of good quality and plenty of waste for the mill.

East Broughton Asbestos Manufacturing Co.—The old H. Williams Mine (Broughton VII, 13 centre N. E. ½) was re-opened at the end of the season and a small mill was put up on the same principle as the others with a crusher, grinder, rollers, tables, ventilating fans and a cyclone, the whole fed by a boiler of 125 horse-power and lighted by electricity. The mine is situate about one mile from East Broughton station, and consists of a shallow excavation with a derrick. The rock is very fibrous and practically everything has to go through the mill. A cylindrical drier has also been put up.

At the time of my visit, about the middle of December, the mine and mill had been in operation for a fortnight and about 20 men were employed.

Asbestos & Asbestic Co., Danville.—The company worked steadily throughout the year, using the temporary 2 cyclone mill put up last year after the destruction of the large mill by fire. Its capacity is 300 tons of rock and good

results have been obtained. However the building of a new mill of great capacity has been begun on a plan similar to that of the old one, utilizing what was saved from it.

A new boiler has been put in which will bring up the capacity to 700 horse-power and the new mill will have 6 cyclones. At the time of my visit in December, the work was pretty well advanced, and it was hoped that the mill would be working about May, 1902.

The mine and mill were in full operation. The mining plant consisted of 7 cable derricks and a compressed air machine capable of driving 14 drills.

Some prospecting was done in Tingwick, particularly on lots XI, 20. W. ½ 19 where a shaft of about fifteen feet was sunk and fine fibre was found, some specimens being an inch and a half long. Serpentine showing similar indications is in sight on the banks of the brook as well as on the flat ground of this district where some slight work has been done. The serpentine and asbestos are the same as those of Asbestos which lies 5 miles to the S. W.

No work has been done on the Laurentian asbestos of the Ottawa region, but about 20 tons of asbestos products have been shipped by the Gatineau railway.

To sum up, the shipments of asbestos during the year for theThetford Black Lake and Danville districts may be set down as follows :

1st class crude. . . .	2,083 tons of 2,000 lbs	worth.	$ 348,579
2nd " "	2,660 "	" "	263,855
Fibre	.14,659 "	" "	450,193
Paper stock	.14,054 "	" "	211,688
	33,456		$1,274,315
Asbestic.	6,831		10,114
	40,287		$1,284,429

Say, in round numbers, 40,300 tons of asbestos products worth $1,300,000, the value at the mine or at the mill ; about 1400 men are employed all the year round at this industry and their wages amount to $553,000. Moreover 20 tons of rock containing asbestos were shipped from the Ottawa region.

GRAPHITE.

In the neighborhood of Buckingham, the mines were not in operation and only the mill of the North American Graphite Company has worked

since the month of June, utilizing the ore taken out formerly. A couple of hundred tons have been taken out but the quantity shipped is much less.

In the neighborhood of Calumet, a new company, The Calumet Graphite Co., did some work during the summer on lots 2 and 3 of ranges II and III of Grenville (Argenteuil). A dozen men were employed and about a hundred tons got out, a portion of which was shipped to the Globe Refining Co., of Jersey City, N.Y. A shaft 80 feet deep was sunk and several veins of fairly pure graphite were found. The company proposes to develop its property. The other companies mentioned last year did not work.

The total quantity of graphite shipped from the Province is as follows :

	31 tons prepared, worth.	.$3,100
	53 " crude, "	1,590
Total. . .	84	$4,690

SULPHATE OF BARYTA.

The Foley mine, in Hull, was worked for six months with seven men and yielded 425 tons, valued at $2975. The ore is shipped to Montreal and utilized by the Canada Paint Co.

PHOSPHATE.

This industry is at a standstill and no special work has been done. The small quantities shipped came from the mica mines or from the phosphate left from old mines. Mr. J. F. Higginson, of Buckingham, who is practically the only person engaged in the industry, gives us the following figures :

During the year he shipped 358 tons of 80 per cent, 268 tons of which were used at Buckingham in the manufacture of phosphorus. There are still on hand 380 tons of the same grade ready for shipment. Moreover 675 tons of low grade ore have been used in the manufacture of chemical fertilizers. The greater portion of this production comes from the Blackburn Bros. mica mine. The price remained the same.

Thus the quantity shipped is :

	358 tons of high grade, worth. . . .	.$3,580
	675 " low grade "	2,700
Total . . .	1033	$6,280

FELDSPAR.

Mr. W. A. Allan, of Ottawa, worked during the year on lot VIII, 26, of Templeton, and got out a thousand tons a portion whereof was shipped to the United States viâ Gatineau Point Station (C.P.R.) A small quantity was also shipped viâ Buckingham.

The total shipment amounts to 410 tons of the value of $1271.

MICA.

The mica industry was not flourishing during the year owing to the low prices offered. Some of the most important mines were worked while the small companies or private individuals remained idle. Much less prospecting was also done. Nevertheless this stoppage is only temporary and there is some hope that this industry will be developed again. Practically, the only mines in operation were those of Blackburn Bros., Wallingford Bros., and the Webster Co.

A new mine was also opened and worked by Mr. Charles Guertin and others on lot X, 19, of Wentworth, county of Argenteuil, a couple of miles from Chapleau station, on the Montfort Colonization Railway. A certain quantity of good mica was got out and shipped.

Blackburn Bros. mine.—This mine is really the only one that has been steadily in operation throughout the year. When I visited it, in October, 80 men were employed, the average for the year being 65. The working is carried on in the great excavation and in the direction of the old shaft. As stated in my last report, two cable derricks and compressed air drills are used. Mica continues to be abundant and of good quality. It is rough trimmed and sent to Ottawa to be finished in the company's mills where about forty operatives, chiefly women, are employed. A portion only of the product has been shipped.

Wallingford Bros. & Co.—This mine remained closed until the month of May and was worked at irregular intervals for about 3 months with from 15 to 20 men, producing a good quantity of mica which was prepared for market. The work consisted chiefly in developing and prospecting on fresh surface indications.

The Ottawa Mica Mining Co., Ltd.—Mr. E. Wallingford and his partners have also begun operations on a new property near Battle Lake, on lots XIII, 4 and 5 of Templeton. The work was continued during 6 months with a dozen men and consisted in developing the mine, an appreciable quantity of

good mica being got out, a portion whereof, of good dimensions, was prepared for market.

The Webster Co. worked with a dozen men for 5 months at the Cascades, Chaibee and Dacy mines. The two latter were worked the most and their yield was fairly good. The mica is prepared in the company's mills in Ottawa.

Mica Manufacturing Company. — A little work was done in the mines under its control and some thousand pounds of prepared mica were shipped, a small quantity going to England.

Vavassour Mine Association. — A few men got out a small quantity of mica, a little of which was shipped.

Fortin and Gravelle did little work on their mines, but shipped small quantities of mica they had on hand.

Some prospecting was done but it is hardly worth mentioning. I would however mention among the new ones : Templeton, VI. 14, by James Bready where a little mica and phosphate can be seen, and XIII. 8, by L. McLaurin.

The other mica producers practically did not work ; they merely shipped small quantities out of what they had on hand from last year.

According to the companies' reports, the quantities of mica shipped during the year, would be 65 tons of raw mica worth $3,600, and 152,000 of thumb trimmed mica worth $36,000, say a total of $39,600

The number of men employed was about 150 for periods of from 3 to 10 months without counting the prospectors and persons employed in trimming at Ottawa ; the wages paid amounted to $35,000.00.

The quantities shipped may be taken as follows from the companies' reports :

1/3	81,575 pounds	worth	$ 8,526
2/3	30,462 "	"	7,629
3/4	24,742 "	"	8,537
3/5	11,704 "	"	7,742
4/6 and over	3,517 "	"	3,566
Total	152,000 "	or 76 tons	36,000

Besides 65 tons of raw mica shipped from the Ottawa mines and valued at $3,600.

PETROLEUM.

Prospecting and boring were continued in the Gaspé peninsula, in the neighborhood of Mississippi Brook and in Gaspé Bay South, without producing any marked change. All the work was done by the Petroleum Oil Trust, as the Canada Petroleum Company which had carried on extensive works last year, had gone into voluntary liquidation.

When I visited Gaspé in July, well No. 33, was being bored and some difficulties were encountered owing to water ; No. 35 was down to 400 feet, and 36 was not begun but the derrick and machines were ready and the men were prepared to work. These wells were on the hill in rear of No. 11 district. Two other wells, 37 and 38, have since been begun in the same district. Since then 35 has got down to 1,800 feet after reaching the limestone ; 33 to 2,400 ; 36 to 1650 ; 37 to 2,000, and 38 to 600 feet.

During part of the year, the company pumped the wells in which oil had been struck, in particular Nos. 1 and 2 (Canada Petroleum Co.), 20, 32, 34 and several others ; all these wells steadily yield small quantities of oil which is collected in tanks, then conveyed by pipes to central tanks where a couple of hundred barrels have thus been stored.

In 1900 and 1901, a refinery was put up by the Canada Petroleum Co. It is situate on the left bank of the York river, about eight miles from Gaspé Basin, on lots S. ½ 31, 32 of range I of Gaspé Bay South. The plant consists of two stills of 150 barrels capacity each, with a series of tanks and the necessary pumps and engines with a central tank of 2,500 barrel capacity. The tanks are made of iron and are connected by pipes. There are ten of 500 barrels, 2 of 300, besides one of 500 barrels in the Mississippi district, and those of the various wells. The total capacity is from 8,000 to 9,000 barrels and the refinery is connected with the Mississippi and other wells by about 15 miles of 2 inch pipe.

Hitherto oil has not been found in paying quantities, but the region has been prospected to Narrow, on the York river, about 30 miles from the sea where the last well I visited, No. 12 (C. P. C.) was left unfinished by the Canada Petroleum Company. In the Mississippi district, the few wells that were regularly pumped dry during the year, have constantly shewn a little petroleum and notwithstanding the slightly encouraging results obtained, one cannot help supposing the presence of oil in greater abundance in some part of this district.

About 35 men were employed steadily by the company, and the borings are continued.

PEAT.

In previous reports, I called attention to the importance this industry may acquire in our province.

At the beginning of the year, the Canada Peat Fuel Company, Ltd., of Fraserville, put up plant on a large peat bog near Cacouna station. I visited it in the month of July. It consists of a mixer which distributes the peat in the shape of pulp to a moulding machine. The peat is mixed with a composition of combustible products the basis whereof is crude petroleum. The pulp at that time was not compressed but moulded, each brick weighing 2 pounds. The capacity of the mill was 15 tons per 10 hours. The motive power was supplied by a boiler of 20 horse-power in which the light surface peat was burned; 8 men were employed, including those who dug the peat. The thickness of the peat bed varies from 2 to 10 feet and even more, it is said. I understand that the company' processes were covered by special patents and that improvements suggested by experience were to be made to this trial plant. Unfortunately the whole was destroyed by fire, in the autumn, but fresh trials are to be made.

It is to be hoped that the work will be continued and that other companies will also commence operations. We have in the province extensive areas covered with peat which if once developed would greatly add to our national wealth.

MISCELLANEOUS.

Nothing was done in connection with molybdenite.

Natural gas was not worked, but at several points slight surface borings were made and in some places this gas is used for local purposes, particularly at Ste. Geneviève de Batiscan, where a rather abundant source is said to exist.

The St. Léon and Radnor mineral water springs continue to supply water highly appreciated by consumers. To the list of springs already known must be added that of Mr. H. A. Riopel, at Lake Temiscamingue ; it supplies excellent water containing, but little mineral salts ; it is slightly ferruginous and sulphurous. There is another spring at McNider (county of Matane), and one at the mouth of the Manicouagan river.

A small deposit of marl has also been found on Mr. P. G. Giroux' farm at Beauport. Deposits of infusorial earth have been found in the neighborhood of Shawenegan, and on lot 69 of Stoneham, (county of Quebec).

In the Magdalen Islands, prospects were carried on last year which showed that the manganese known to exist there is to be found on several islands and in fairly great abundance. Nevertheless no work has yet been done.

BUILDING MATERIALS.

Granite. — Granite was quarried at Rivière à Pierre, on the Lake St. John Railway, at Stanstead, and at St. Samuel, near Lake Megantic, also at St. Philippe d'Argenteuil and Mount Johnson. A rather considerable quantity was obtained representing a value of $146,000, and 350 men were employed.

Cement.—The mills of the Crescent Cement Works, at Maisonneuve, near Montreal, were destroyed by fire on the 6th July last, but they have been rebuilt and enlarged. The output therefore was small this year, but it is capable of being increased next year. Most of the cement was used in Montreal.

Lime.—I have nothing particular to say in connection with this industry which is carried on as usual.

Bricks.—The production continues to increase. The Ascot Corner Company has enlarged its establishment and its manufacturing capacity. A new company called "The Eastern Townships Brick Company" has also been organized.

Building stone.—There is nothing particular to mention in connection with this industry, which has been carried on under the same conditions.

Slate.—Work was carried on at New Rockland this year by contract after the month of May, having been stopped before then. About forty men were employed and the usual quantity of roofing slate was got out, most of it being shipped to Ontario.

Flag stones.—This industry was carried on as usual and with the same results at Dudswell.

SUMMARY STATEMENT OF THE YIELD OF THE MINES IN THE PROVINCE OF QUEBEC

FOR THE YEAR 1901.

Product (tons of 2000 lbs.)	Wages paid.	Number of workmen	Quant. ship. or used.	Gross value.
Magnetic iron ore	$ 1,200	1[illegible]	1000	$ 2,000
Bog iron ore	28,978	120	14489	28,978
Chrome iron	12,060	90	1274	16,744
Copper ore	82,000	250	20296	126,500
Galena	22,900	39	227	9,277
Asbestos	553,000	1,577	33466	1,274,315
Asbestic			6831	10,114
Mica (thumb trimmed)	35,000	150	76	36,000
Mica, raw			65	3600
Ochre, calcined	7,500	51	1253	14,595
Graphite, prepared	2,500	25	31	3,100
Graphite, raw			53	1,590
Feldspar	2,000	5	420	1,271
Sulphate of Baryta	1,850	7	533	2,975
Phosphate			1033	6,280
Gold (ounces)	7,838	35	80	1,440
Slate (squares)	6,400	40	3170	12,252
Flag-stones (square yards)	1,944	8	3000	2,700
Cement (barrels)	8,000	35	17000	28,000
Granite	92,000	350		146,000
	$865,110	2,792		$1,727,731

As regards lime, bricks and building stones, I give the same figures as in previous years, owing to the difficulty of getting exact figures each year, but there is certainly an increase in the production, and, calculating the wages paid acording to the number of workmen, we get a figure of not less than $600,000.

Lime	350 workmen	1 million bushels		$ 140,000
Bricks	1200 "	120 "		600,000
Stone	700 "	" "		530,000
Total	2250			$1,270,000

Adding the figures of the first table:

2792	1,727,731
Grand total 5042 workmen	$2,997,731

We may thus say that the mines and quarries of the province have during the year yielded products worth $3,000,000, and given employment to 5,000 workmen for periods varying from 3 to 12 months, their wages amounting to about $1,500,000.

QUANTITY AND VALUE OF THE MINERALS SHIPPED FROM CANADA, DURING THE FISCAL YEAR ENDING ON THE 30TH JUNE, 1901, ACCORDING TO THE OTTAWA TABLES OF TRADE AND NAVIGATION AND WHICH MAY APPLY IN PART TO THE PROVINCE OF QUEBEC:—

Asbestos:—1st class	5976	tons,	worth	$327,688
2nd "	3522	"	"	173,824
3rd "	17217	"	"	363.061
	26715	"	"	$864,573
Mica:—Cut	376,144	lbs.	worth	60,522
Knife trimmed	112,625	"	"	19,491
Thumb trimmed	405,771	"	"	66,835
Ground	84,718	"	"	2.740
	979,258	"	"	$149,588
Feldspar	382	tons,	worth	$ 1,156
Chrome	1336	"	"	16.609
Baryta	208	cwt.	"	3,820
Ochre	754,227	lbs.	"	7,732
Mineral water	5,947	glls.	"	2,900
Phosphate	6	tons	"	120
Plumbago	27,459	cwt.	"	40,099
Pyrites	22,146	tons	"	53,357

SHIPPED BY RAILWAY COMPANIES

Canadian Pacific R. R.

Bricks, lime and cement	25211 $\frac{600}{2000}$	tons
Stone	15886 $\frac{1700}{2000}$	"
Copper ore	1	"
Feldspar	409 $\frac{1400}{2000}$	"
Iron ore	12248 $\frac{900}{2000}$	"
Mica	40 $\frac{500}{2000}$	"
Graphite	83 $\frac{1300}{2000}$	"
Phosphate	1952 $\frac{100}{2000}$	"
Baryta	257 $\frac{1500}{2000}$	"

Grand Trunk R. R.

Asbestos	5855	tons
Stone	1921	"
Bricks, cement and lime	23284	"

Boston & Maine R. R.

Copper ore	21209	tons
Stone and sand	14162	"
Bricks	720	"
Lime	54	"

Ottawa Northern & Western R. R.

Iron ore	750	tons
Mica	122 $\frac{760}{2000}$	"
Asbestos	20 $\frac{880}{2000}$	"

Pontiac & Pacific Junction R. R.

Mica	16 $\frac{1580}{2000}$	tons

Intercolonial R. R.

Stone	819 tons
Lime	5334 barrels
Bricks	1200 thousand.

Quebec Central R. R.

Bricks	8612 tons
Lime	8461
Flag stones	1312
Chrome	127
Asbestos	29008
Asbestic	1150
Granite	795
Stone	515
Cement	2

Quebec and Lake St. John R. R.

Bricks	67 car loads
Stone	711 "
Iron ore	10 "

LIST OF MINING COMPANIES

IN THE PROVINCE OF QUEBEC IN OPERATION OR IN A POSITION TO WORK DURING THE COURSE OF THE YEAR, WITH THEIR ADDRESSES.

IRON.

Chs. Lionais—St. Lawrence Hall, Montreal.
J. O. Hibbard—84, Argyle Avenue, Ottawa.

CHARCOAL PIG-IRON

The Canada Iron Furnace Co.—Canada Life Building, Montreal.
John McDougall.—597, William Str., Montreal.

OCHRE.

The Canada Paint Co.—572, William Str., Montreal.
The Champlain Oxyde Co.—(Lusien Carrignan), Three Rivers.

CHROME IRON

Colraine Mining Co. Ltd.—7, Place d'Armes, Montreal.
The Colraine Chrome Co.—W. Lambly, Inverness, Co. Megantic.
The Montreal Chrome Iron Co. Ltd.—Colraine, Co. Megantic.
Boston Chrome Co.—Black Lake, Co. Megantic.
Jos. Nadeau & Co.—Black Lake, Co. Megantic.
L. A. Carrier & Co.—Lévis.

COPPER

Eustis Mining Co.—Eustis, Co. Sherbrooke ;
The Nichol's Chemical Co. Ltd.—Capelton, Co. Sherbrooke.
Wilfred Johnson Co.—(John McCaw), Sherbrooke.
C. E. Kennedy, Suffield, Co. Sherbrooke.
James Reed, Reedsdale, Co Megantic.

LEAD, ZINC, SILVER

The British Canadian Lead Co. Ltd.–Lake Temiscamingue, Co. Pontiac.

GOLD

The Gilbert River Gold Fields, Ltd.—St. Francis, Co. Beauce ;
C. A. Parsons—154, Commercial Str., Boston, Mass., U. S.

GRAPHITE

The Walker Mining Co,—Graphite City, Buckingham, Co. Ottawa ;
The North American Graphite Co. Ltd.—Buckingham, Co. Ottawa
The Buckingham Co.—Buckingham, Co. Ottawa ;
Keystone Graphite Co.—Calumet, Co. Argenteuil ;
Calumet Graphite Co.—Calumet, Co. Argenteuil.

ASBESTOS

Bell Asbestos Co. Ltd.—Thetford, Co. Megantic;
King Bros Co. Ltd —Thetford, Co Megantic;
Johnson's Co.—Thetford, Co. Megantic;
The Beaver Asbestos Co.—Thetford, Co. Megantic;
W. R. Kerr & Hayden.—Black Lake, Co. Megantic.
Standard Asbestos Co. Ltd.—, Black Lake, Co. Megantic.
Canadian Asbestos Co. Ltd.—Black Lake, Co Megantic;
Union Asbestos Mine—Black Lake Co. Megantic;
Manhattan Asbestos Co.—Black Lake, Co Megantic.
James Reed—Reedsdale, Co. Megantic;
East Broughton Asbestos Mining Co.—East Broughton, Co. Beauce.
The Asbestos & Asbestic Co. Ltd.—Danville, Co. Richmond;
The Ottawa Asbestos Mining Co.—514, Sussex Str., Ottawa.

PHOSPHATE.

J. F. Higginson—Buckingham, Co. Ottawa.

PETROLEUM.

The Petroleum Oil Trust, Ltd., London.—Gaspé Basin, Co. Gaspé.

FELDSPAR.

W. A. Allan, Victoria Chambers, Ottawa.

SULPHATE OF BARYTA.

The Canada Paint Co., 572, William street, Montreal.

SLATE.

New Rockland Slate Co.—New Rockland, Co. Richmond.

FLAG STONES.

F. R. Bishop—Bishop's Crossing, Co. Wolfe.

CEMENT.

Crescent Cement Works—(Th. M. Morgan), Longue-Pointe, Montreal.

GRANITE.

Stanstead Granite Co.—Beebe Plain Co. Stanstead.
S. B. Norton.—Beebe Plain, Co. Stanstead.
James Brodie.—Beebe Plain Co. Stanstead.
The Whitton Granite Quarry Co.—St. Samuel, Co. Compton.
Mr. Fitzgerald.—Ste. Cécile, Co. Compton.
Jean Voyer & Fils.—Rivière à Pierre, Co. Portneuf.
Joseph Perron.—Rivière à Pierre, Co. Portneuf.
M. P. Davis.—565, Rideau Str., Ottawa.
The Laurentian Granite Co.—St. Philippe, Co. Argenteuil.
J. A. Nadeau.—Iberville.

MICA.

Wallingford Bros.—Perkins Mill, Co. Ottawa.
Blackburn Bros.—46, Sussex Str., Ottawa.
Sills Eddy Mica Co.—398, Wellington Str., Ottawa.
Mica Manufacturing Co. Ltd.—213, Dalhousie Str., Ottawa.
Vavassour Mining Association.—(T. F. Nellis), 22, Metcalf Str.,Ottawa.
Webster & Co.—274, Stewart Str., Ottawa.
Lila Mining Co.—(D. L. McLean) 51, Sparks Str., Ottawa.
Chs. Guertin—398, Wellington Str., Ottawa.
W. F. Powell—119, Sussex Str., Ottawa.
E. B. Haycock—49, Cooper Str., Ottawa.
Brown Bros.—Cantley, Co. Ottawa.
J. Fortin & Gravelle.—Hull, Co. Ottawa.
Angus Cameron—Buckingham, Co. Ottawa.
Lewis McLaurin—East Templeton, Co. Ottawa.
Richard Moore—Pickanock, Co. Ottawa.
Chs. L. Meyer—Victoria Chambers, Ottawa.
J. E. Askwith—24, Alexandra Str., Ottawa.
Joshua Ellard-Pickanock, Co. Ottawa.
The Glen-Almond Mica and Mining Co., Buckingham, Co. Ottawa.
W. A. Allan—Victoria Chambers, Ottawa.

BUYERS OF MICA.

Sills Eddy Mica Co.—398, Wellington Str., Ottawa.
Webster & Co.—274, Stewart Str., Ottawa.
Eugene Munsell & Co.—332, Wellington Str., Ottawa.
Canadian Mica Co.—486, Sussex Str., Ottawa.

BRICKS.

I give below the list of persons or companies manufacturing over a million.

Thos. W. Peel & Co.—	Montreal.
J. Brunet & Co.	"
Chs. Sheppard & Son	"
Joseph Bernier,	"
Joseph Descaries,	"
Laprairie Pressed Brick Co.,	Laprairie
Narcisse Blais,	Quebec
C. Rochette,	"
Frs Grenon,	"
Paradis & Létourneau	"
Laliberté & Fils.—St-Jean Deschaillons	
G. V. Charland	"
D. G. Loomis & Son, Sherbrooke.	

LIME

The following manufacturers, who are the most extensive turn out from 1000 to 11,000 tons per annum.

Dominion Lime Co.,	Dudswell
F. G. Brigham,	Ottawa
H. Gauthier & Cie.,	Montreal
Cyrille & Gervais,	"
Olivier Limoges,	"
Montreal Lime Co.,	"

GOVERNMENT ASSAY LABORATORY.

In April, 1901, an arrangement was made with Mr. Milton L. Hersey, M. Sc., chemist, of Montreal, by which he undertook to make assays in his laboratory at very low rates for prospectors of this province. This has had excellent results and a great many samples have been assayed as shown in the following statement supplied by Mr. Hersey.

Complete assays :

Mineral water 2 ; peat 1 ; bituminous coal 1 ; anthracite 1 ; chrome 4 ; marl 2 ; clay 4.

Determining an element :

Iron 22 ; gold 63 ; silver 58 ; silica 2 ; mica 1 ; chrome 15 ; platinum 4 ; cobalt 2 ; manganese 1 ; sulphur 2 ; titanium 31 ; water 1 ; magnesium 1 ; copper 16 ; nickel 2 ; lead 7 ; phosphate 1 ; asbestos 2.

Identification of minerals 250.

We give below for general information the tariff of fees and other information as to the taking of samples.

MILTON L. HERSEY M. Sc., GOVERNMENT CHEMIST.

146 *St. James street, Montreal.*

FEES FOR ASSAYS AND ANALYSES.

		4 Samples or less at one time, each.	More than 4 at one time, each.
Gold		$1.00	$0.90
Silver		1.00	0.90
Gold and Silver		1.00	0.90
Copper		1.00	0.90
Lead		1.25	1.15
Zinc		1.50	1.35
Nickel		2.00	1.80
Platinum		2.00	1.80
Arsenic		2.00	1.80
Manganese		2.00	1.80
Chromium		2.00	1.80
Antimony		2.00	1.80
Bismuth		2.00	1.80
Silica	smelting quality of iron ores	1.00	0.90
Iron (metallic)		1.00	0.90
Phosphorous		2.00	1.80
Titanium		1.50	1.35
Sulphur		1.50	1.35
Alumina		1.50	1.35
Ferric Oxid		1.00	0.90
Lime		1.50	1.35
Magnesia		1.50	1.35
Moisture		0.25	0.25
Combined Water		0.50	0.50
Insoluble Matter		0.50	0.50
Graphite		1.50	1.35

Identification of minerals.—The laboratory is prepared to issue a report on samples giving description as far as may be determined by rough qualitative tests, with the probable metallic contents or commercial value of the sample. A nominal fee of 25 cts. is charged for each sample.

Direction for the proper selection of samples.—If the commercial value of an ore deposit is desired, an average sample for assay may be taken thus: Detach a small piece (¼ to ½ lb.) every 10 or 12 inches across the whole

width of the deposit. Repeat this operation every 8 or 10 yards, going the whole length of the deposit. The total amount of ore collected represents an average sample. If the deposit is opened up, samples from each shaft and level taken in a similar way must be included with surface samples. Amount of ore for average sample, 5 to 40 lb. Deposits of variable character (e. g. gold ores) require more than those of uniform character (e. g. iron ores).

A sample consisting of a single piece of ore, however large is practically of little value in testing a deposit.

Directions for quartering down.—Large quantities of ore for assay may be reduced by "quartering down" thus: crush whole amount to size of a walnut, make into a round heap, mix thoroughly and divide into four equal parts. Select one quarter, crush to size of a bean, mix thoroughly and quarter as before. Proceed in the same manner until the quantity is reduced to 1 or 2 lbs. The resulting pulp represents a fair average of the large sample.

Assays made on this pulp will show the average value of the large sample. A more accurate, though tedious, method of reducing an ore sample is to select two opposite halves from the quartered crushed samples in place of one quarter as above.

Directions for sending samples to be assayed.—Crushed samples, representing the average of large quantities, or samples less than 5 lb. in weight, may be sent by mail as 5th class matter (1 c. per oz. limit weight 5 lb.) or per parcel post (1 c. per 4 oz., limit weight 24 oz.) Write your own name and address plainly on the parcel and send instructions with money in payment of fees in a separate letter. When more than one sample is sent at one time, each sample must be distinctly marked and numbered,so that they may be identified by instructions in letter. Samples over 3 lbs. in weight may be send per express, charges prepaid.

Check assays.—The laboratory makes a specialty of Check assay work on gold ores. Samples sent in for check assays must be crushed at least to 5 or 10 mesh, especially in the case of gold ores variable in richness. A sample consisting of a single piece of ore, however large, is practically of little value in testing a deposit, and in no case suitable for check assay. At least 12 ounces of pulp must be sent for assay.

Two pieces of gold ore taken from the same spot in a deposit will not necessarily give the same values on assay.

The most satisfactory method of checking results is to mix ore pulp (obtained by crushing and sampling down by halving or quartering as per instructions above), and divide the pulp into two equal parts, sending the separate lots to different assayers, or to this laboratory with different marks.

Sample bags addressed to this laboratory for sending ore pulp by mail may be obtained free on application.

For information apply to the BUREAU OF MINES, Quebec.

Terms.—Money in payment of fees sent by Registered Letter, Post Office Order, or Postal Note, must invariably accompany samples in order to insure prompt return of certificates.

LEGISLATION.

The following change has been made in articles 1443 and 1444 of the Mining Law : The Lieutenant Governor in council may determine the extent of mining concessions for inferior metals as well as the price of such concessions.

These provisions apply particularly to surface minerals not mentioned in the law.

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The mining industry in Quebec

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